
A New Species of *Hymenocallis* (Amaryllidaceae) in the Lower Central Florida Panhandle

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ABSTRACT. A new species of spider-lily, *Hymenocallis franklinensis*, is described in the lower central Florida panhandle. It is endemic to the lower Ochlockonee River drainage. The new species is distinguished from other *Hymenocallis* by its narrowly liguliform leaves, lanceolate scape bracts that distinctly taper in the distal half, subglobose fruits, and its chromosome numbers of $2n = 43, 44$. A key is provided to distinguish among similar species.

Key words: Amaryllidaceae, Florida, *Hymenocallis*, North America, U.S.A.

In the spring of 1991, Loran C. Anderson observed spider-lilies (Fig. 1) blooming along a side channel of the lower Ochlockonee River (Fig. 2). Anderson pressed the specimens as *Anderson 13382* (Fig. 1). In late May of 1991, Smith examined this collection and was puzzled by its morphology. The leaves were narrowly liguliform, apparently coriaceous, and judged to be similar to leaves of *Hymenocallis crassifolia* of Herbert observed just a few weeks earlier in the outer Coastal Plain wetlands of the Carolinas. However, the flowers and the subtending bracts were decidedly more robust. This collection was deemed unique in its combination of characters and became a leading candidate for further studies. Anderson took Smith to Cow Creek in June 1991, and living *Hymenocallis* plants in a vegetative state were collected and vouchered as *Smith & Anderson 1531* to be used in both morphological and cytological analyses.

MATERIALS AND METHODS

All morphological features of *Anderson 13382* were critically examined and carefully measured. A

description was prepared of this collection. Additional morphological data were gathered from the following collections: *Smith, Garland & Knight 1631*, *Smith & Anderson 1717*, *Anderson 16814*, and *Anderson 18299*. *Hymenocallis* bulb collections were also made from Bear Creek adjacent to Cow Creek (Fig. 3) by Anderson and Garland and Knight. These collections were sent to Smith without number, and he potted these bulbs and added them to his living collections of *Hymenocallis*.

The measurements presented in the description, with the exception of the bulb and seed and fruit dimensions, were made from dried, well-pressed specimens. Fresh measurements were made of the bulbs and seeds and fruits, as they could not be adequately pressed to show their proper dimensions.

CYTOLOGY

Cytological analyses were undertaken on the *Hymenocallis* bulb collections that were obtained from Cow Creek and Bear Creek. The source of the analyses were actively growing root tips from potted bulbs. The cytological techniques used were those followed in Jones and Luchsinger (1986) as adopted from Flory and Smith (1980). Well-spread metaphase figures were examined with a Leitz microscope and photographed in Flory's laboratory at Wake Forest University or with a Wolfe microscope in Smith's laboratory at High Point University. Counts were obtained from the following collections listed in Table 1.

Smith and Anderson 1531 was the first *Hymenocallis* bulb collection from which a chromosome count was obtained for the Cow Creek spider-lilies.

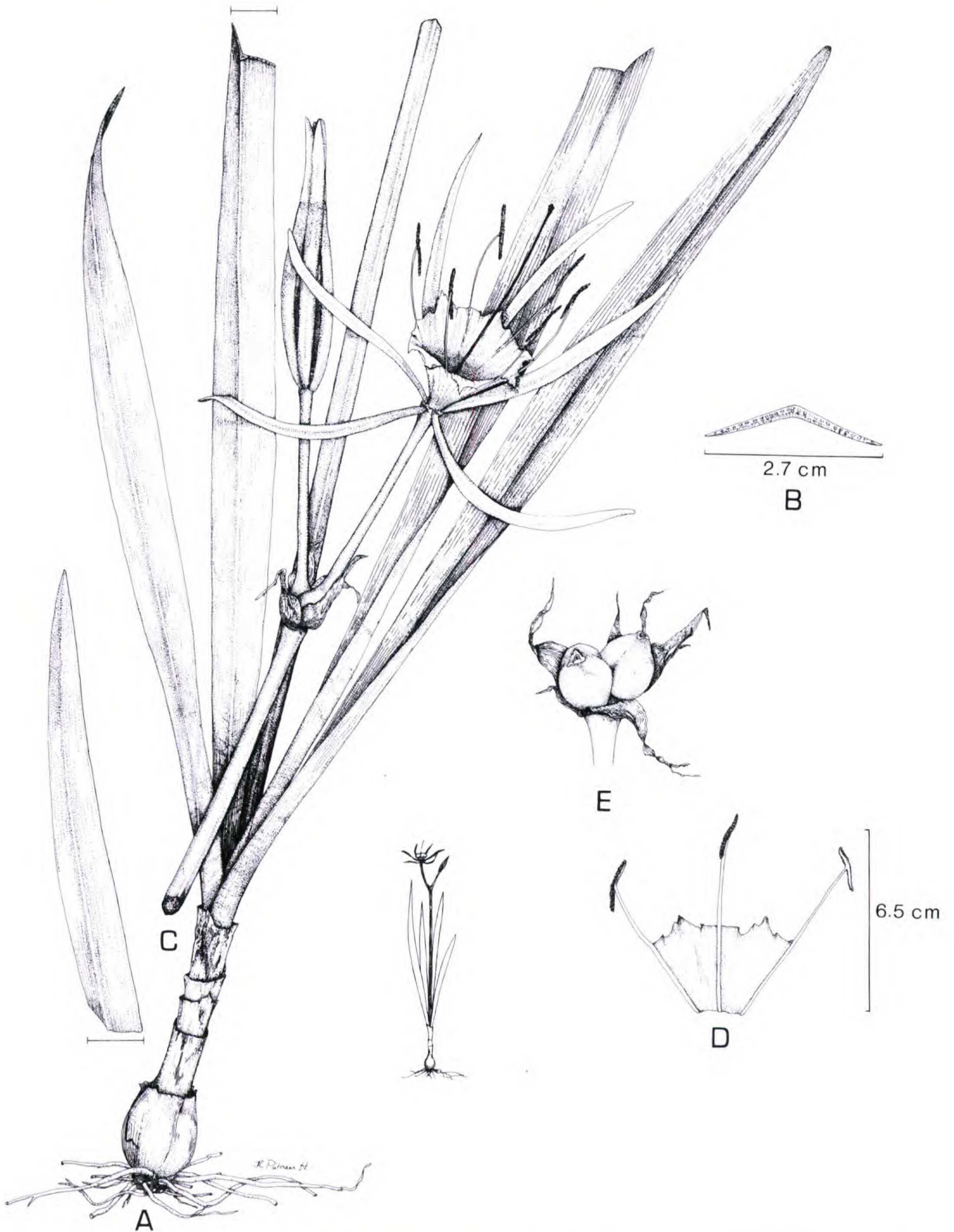
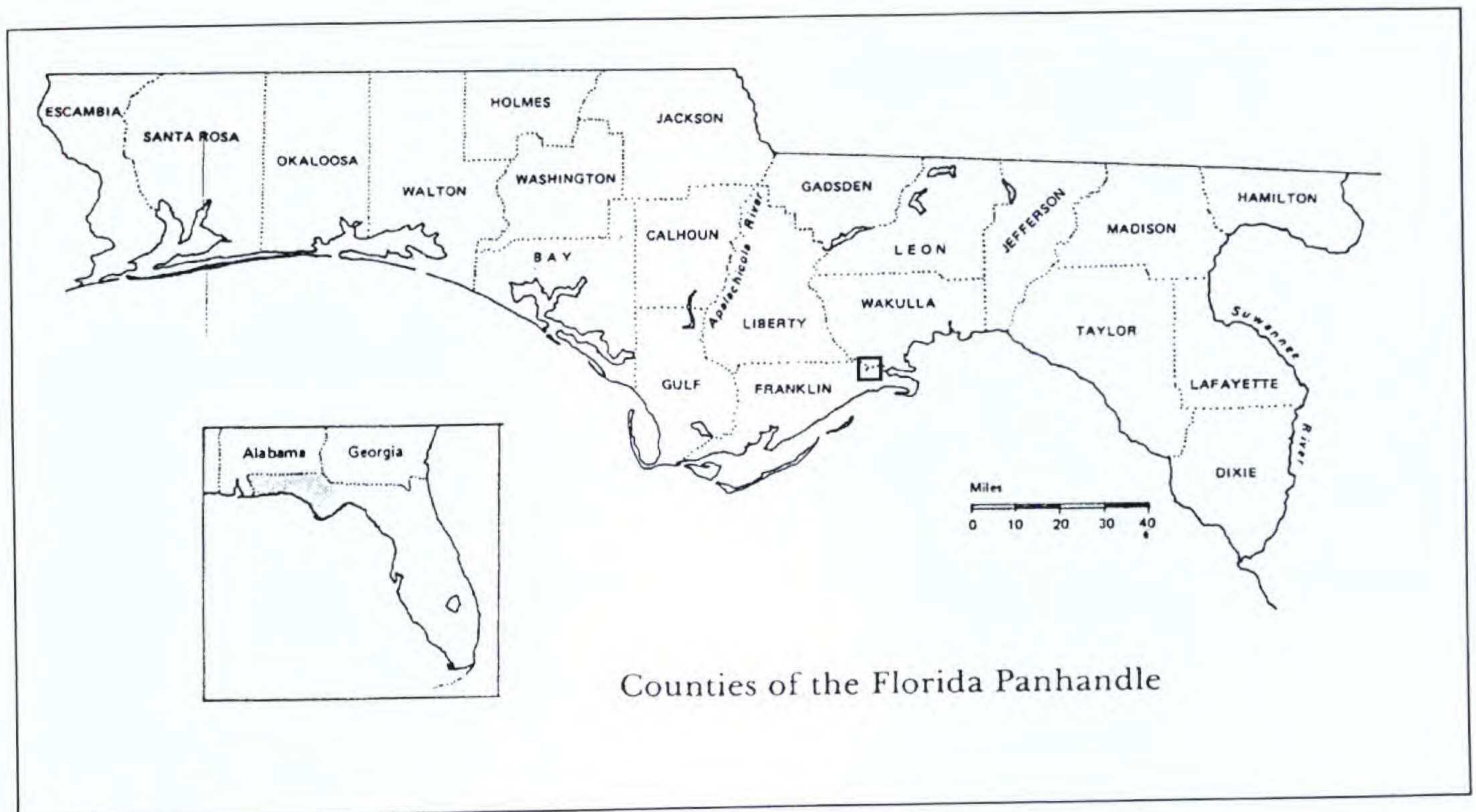


Figure 1. *Hymenocallis franklinensis* G. Lom. Smith, Anderson & Flory. —A. Habit, plant aspect at right. —B. Leaf cross section. —C. Scape with 2-flowered inflorescence. —D. Section of staminal cup. —E. Developing fruits. (Drawn by Jean Putnam Hancock.)



Counties of the Florida Panhandle

Figure 2. The block encloses the lower Lower Ochlockonee River drainage, which forms the far northeastern border of Franklin County, Florida, separating it from Wakulla County. Map from A. F. Clewell, *Guide to the Vascular Plants of the Florida Panhandle*, used with permission of University Presses of Florida, Gainesville.

As shown in Table 1, it was $2n = 44$. This count indicated an affinity to *Hymenocallis choctawensis*, which also had been determined to have that number (Fig. 4) (Smith et al., 1991). As noted in Table 1, most of the other counts determined for spider-lilies in the lower Ochlockonee River drainage were also $2n = 44$, including *Smith & Anderson 1717* (Fig. 5).

Cytological analyses of *Smith et al. 1631* revealed an unexpected count. Repeated counts of this collection showed its chromosome number to be $2n = 43$, with 37 two-armed chromosomes and 6 telocentric chromosomes (Fig. 6).

An interesting relationship exists between the somatic chromosome numbers of 43 and 44. The count of 43 from *Smith et al. 1631* comprises 37 two-armed chromosomes and 6 telocentric chromosomes. The count of 44 from the other collections comprises 36 two-armed chromosomes and 8 telocentric chromosomes. Although chromosome numbers are different, the number of chromosome arms is the same, 80. Such an equivalency in arm number is suggestive of genetic correspondence as indicated by Flory and Schmidhauser (1957) and Flory (1976). It is not known what influence the presence of two chromosome races among the Cow Creek spider-lilies may contribute to their genetic distinctiveness, but centric fission, which likely produced the telocentric chromosomes, is consid-

ered to be a mechanism of speciation in *Hymenocallis* (Flory, 1976).

NOMENCLATURE AND MORPHOLOGY

Based on our field, herbarium, and cytological analyses, we have decided to recognize the spider-lily populations along the lower Ochlockonee River drainage as the new species *Hymenocallis franklinensis*. It is possibly a local endemic. Populations may also be sought among the Sopchoppy River drainage, but have not been investigated by the authors. All the collections to date have been made from Franklin County, with the exception of one collection that has been made from adjacent Wakulla County at Shepherd's Spring in St. Marks National Wildlife Refuge (*Anderson 16814*). Distinguishing characteristics are the narrowly liguliform, nearly erect, lustrous leaves; moderately robust flowers with funnellform staminal cup; lanceolate scape bracts that distinctly taper in the distal half; and subglobose fruits with obovoid seeds.

Hymenocallis franklinensis G. Lom. Smith, L. C. Anderson & Flory, sp. nov. TYPE: U.S.A. Florida: Franklin Co., opposite the boat landing at end of CR-370, bordering Cow Creek near its confluence with the Ochlockonee River, 1 mi. E of hwy. 319, 27 Apr. 1991, *Anderson 13382* (holotype, FSU). Figure 1.

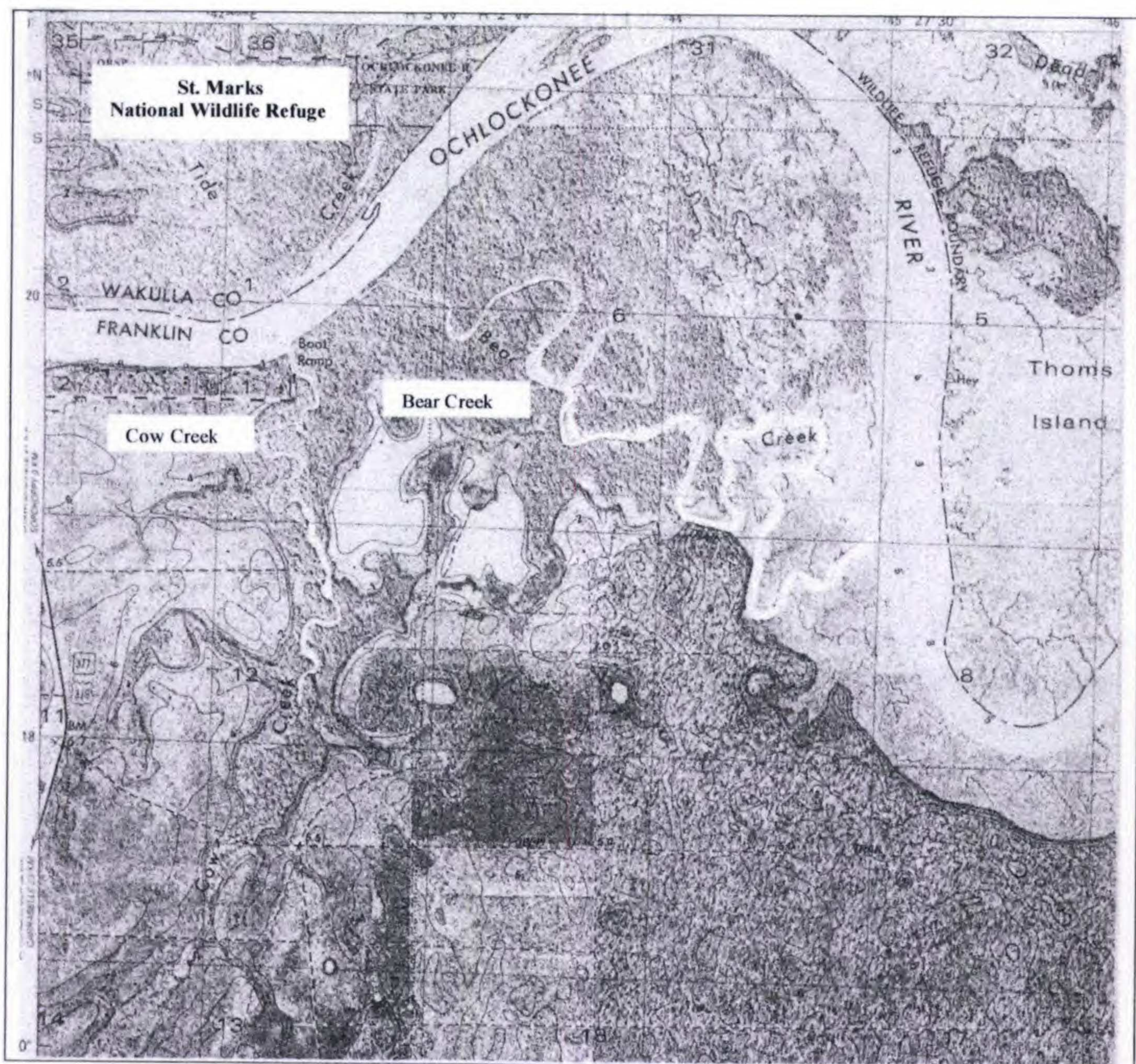


Figure 3. Topographic enlargement of the portion of the block in Figure 2 showing the bow of the lower Ochlockonee River (Franklin County) and the tributaries of Cow Creek and Bear Creek. Note St. Mark's National Wildlife Refuge to the northwest in adjacent Wakulla County.

Planta ex bulbo rhizomatoso, anguste ovoideo, 2.5–4.5 × 2–3.5 cm, collo 3.5–7 cm longo. Folia 3 ad 5, fere erecta, lucida, anguste liguliformia, distincte canaliculata, coriacea, 2.8–4.8 dm × 1.8–2.7 cm. Inflorescentia bi- vel triflora; scapo ancipitio, glauco, 3–4.5 dm longo; bracteis scapi 2, gemmas includentibus, 3–4.5 cm × 10–15 mm.

Flores 2 ad 3, fragrantis; perianthii tubo viridi, 6.5–9 cm longo; segmentis parum ascendentibus, albis; poculo staminum albo infundibuliformi in aetate gradatim patente, 3–4 × 4–5.5 cm; antheris 1.5–1.8 cm longis; polline aureo; stylo 14–17 cm longo; ovario ovoideo, 1–1.5 cm × 5 mm; ovulis 2 vel 3 in quoque loculo. Capsula subglo-

Table 1. Chromosome counts made from collections from tributaries of the lower Ochlockonee River in Franklin County, Florida.

Collection	Sites	2n
Smith & Anderson 1531	Cow Creek	44 (36 + 8T*)
Smith, Knight & Garland 1631	Cow Creek	43 (37 + 6T)
Smith & Anderson 1717	Cow Creek	44 (36 + 8T)
Garland & Knight 831	Cow Creek	44 (36 + 8T)
Anderson s.n.	Bear Creek	44 (36 + 8T)
Garland & Knight s.n.	Bear Creek	44 (36 + 8T)

* Telocentric.

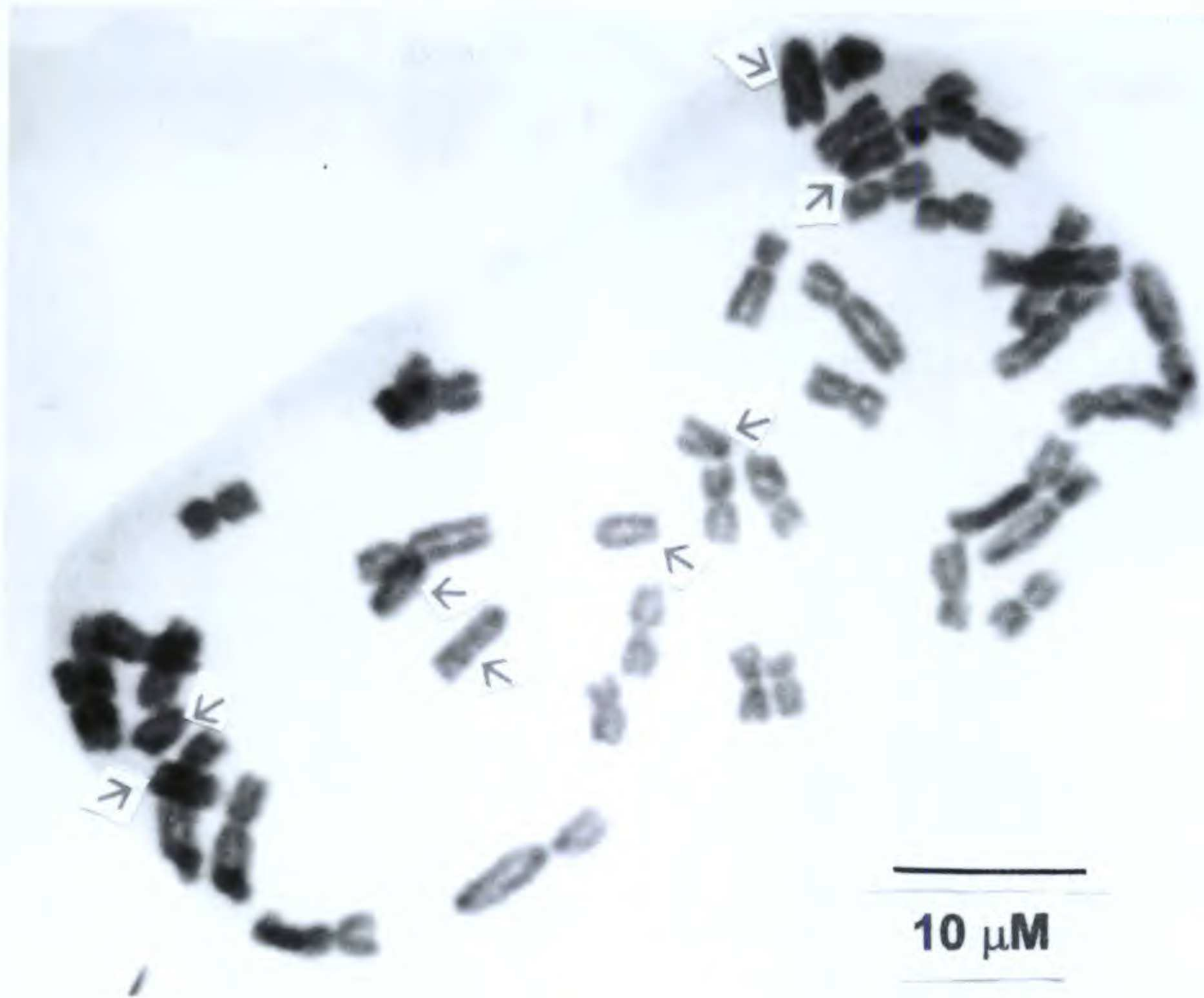


Figure 4. Somatic chromosomes of *Hymenocallis choctawensis*, $2n = 44$, from Smith & Garland 1432. Arrows point to 8 telocentric chromosomes.

bosa, 2–2.5 × 2–2.5 cm; seminibus viridibus, carnosis, obovoideis, 1.6–2.0 × 1.2–1.5 cm.

Bulb rhizomatous, narrowly ovoid, 2.5–4.5 × 2–3.5 cm, neck 3.5–7 cm, basal plate 1–2 cm; tunica grayish brown. Leaves 3 to 5, nearly erect, lustrous, narrowly liguliform, distinctly channeled, 2.8–4.8 dm × 1.8–2.7 cm, coriaceous, apex acute. Scape 3–4.5 dm, 2-edged, glaucous; two scape bracts enclosing the buds, 3–4.5 cm × 10–15 mm; each flower with a subtending bract, papery, persistent, 2.5–4.5 cm × 7–12 mm. Flowers 2 or 3, opening sequentially, moderately fragrant; perianth segments slightly ascending, white, tinged green on keel, 8.8–11.5 cm × 5–7 mm; perianth tubes green, 6.5–9 cm; staminal cup white with a small yellowish green proximal eye, funnellform, spreading with age, shortly tubular below, 3–4 × 4–5.5 cm; margin irregularly dentate between free filaments; free filaments suberect, inserting at a flat sinal base, white, 2.5–3.5 cm; anthers 1.5–1.8 cm, pollen golden; styles green in distal third, fading to white, 14–17 cm; ovaries ovoid, 1–1.5 cm × 5 mm; ovules 2 or 3 per locule. Fruits subglobose, 2–2.5 × 2–2.5 cm. Seeds obovoid, 1.6–2.0 × 1.2–1.5 cm. $2n = 43, 44$.

Phenology. Flowering begins in mid April and continues into mid May.

DISTRIBUTION AND ECOLOGICAL ASSOCIATES

Hymenocallis franklinensis, as we know it, appears to be most abundant along Cow Creek, a southern tributary of the lower Ochlockonee River (Fig. 3). It forms the boundary between Franklin and Wakulla Counties.

Herbaceous plants along the margins of Cow Creek include: *Alternanthera philoxeroides* (Martius) Grisebach, *Canna flaccida* Salisbury, *Cicuta mexicana* Coulter & Rose, *Cladium jamaicense* Crantz, *Crinum americana* L., *Helenium flexuosum* Rafinesque, *Iris hexagona* Walter, *Juncus* spp., *Orontium aquaticum* L., *Osmunda regalis* L., *Peltandra virginica* (L.) Schott & Endlicher, *Physotegia leptophylla* Small, *Polygonum densiflorum* Meissner, *Pontederia cordata* L., *Sagittaria lancifolia* L., *Samolus valerandi* L. subsp. *parviflorus* (Rafinesque) Hultén, *Saururus cernuus* L., *Senecio glabellus* Poiret, and *Zizaniopsis miliacea* (Michaux) Döll & Ascherson. Shrubs, vines, and trees include: *Acer rubrum* L., *Amorpha fruticosa* L., *Am-*

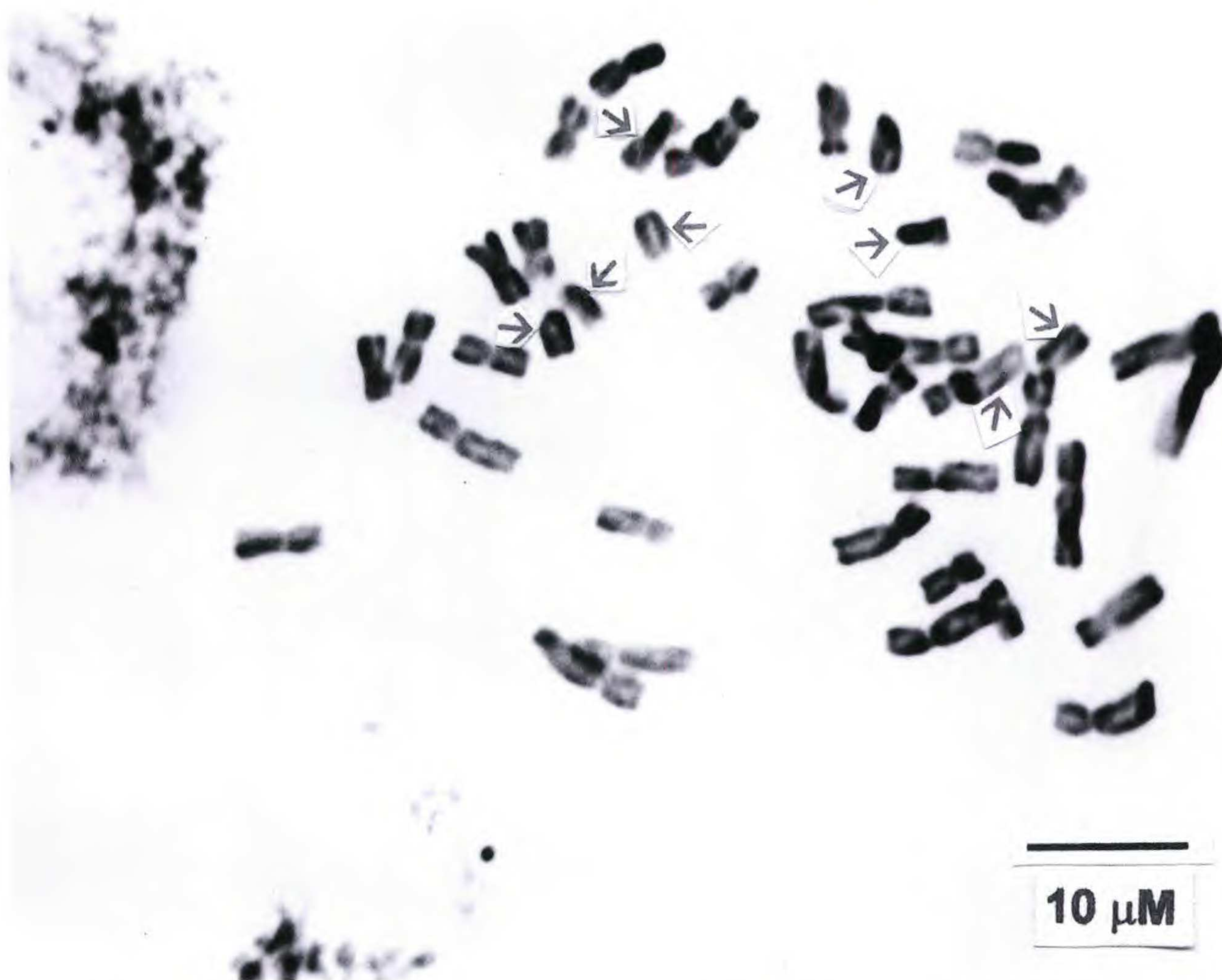


Figure 5. Somatic chromosomes of *Hymenocallis franklinensis*, $2n = 44$, from Smith & Anderson 1717. Arrows point to 8 telocentric chromosomes.

pelopsis arborea (L.) Koehne, *Cephalanthus occidentalis* L., *Chionanthus virginicus* L., *Hypericum* spp., *Ilex vomitoria* Aiton, *Itea virginica* L., *Fraxinus caroliniana* Miller, *Liriodendron tulipifera* L., *Magnolia virginiana* L., *Myrica cerifera* L., *Nyssa sylvatica* Marshall var. *biflora* (Walter) Sargent, *Nyssa ogeche* Bartram ex Marshall, *Persea palustris* (Rafinesque) Sargent, *Rhododendron viscosum* (L.) Torrey, *Taxodium ascendens* Brongniart, and *Toxicodendron radicans* (L.) Kuntze. *Hymenocallis* was more abundant in the open areas along the creek, particularly in association with *Iris hexagona* Walter. All of the above associates have been vouchered by Loran Anderson in the FSU Herbarium.

DISCUSSION

In our quest to determine the identity of the new species, we initially considered *Hymenocallis duvalensis* Traub and *H. crassifolia* Herbert. The former similarly occurs along the Ochlockonee River in the northern Florida panhandle and is distributed northward into south-central Georgia. However, leaves in *H. duvalensis* are not as coriaceous and neither its flowers nor its bracts as robust as those of the new species. *Hymenocallis crassifolia*,

which occurs from the outer Coastal Plain of the Carolinas to northeastern Florida but not into Franklin County or the Florida panhandle, has leaves that correspond to those of *H. franklinensis*, but its flowers and bracts are proportionately smaller. An important consideration of the taxonomy of *Hymenocallis crassifolia*, *H. duvalensis*, and *H. franklinensis* is that all three species have consistently different chromosome numbers (respectively, $2n = 40$, 42 , and 44) and karyotypes.

The species to which *Hymenocallis franklinensis* seems most closely related is *H. choctawensis*, described by Traub (1962) from a bulb collection made by Mary G. Henry in the western Florida panhandle. This relationship is likely supported by the common chromosome number of $2n = 44$ (Smith & Anderson, 2000) and by an overall similarity in floral characteristics. The shape of the cup and the dentate margin are much alike, and the tepal tube lengths and the perianth dimensions are of similar values. However, the two species can be distinguished by their scape bracts and fruits. The bracts of *Hymenocallis franklinensis* are lanceolate and taper distinctly over the distal half. Its fruits are smaller, subglobose, and 2–2.5 cm long by 2–2.5

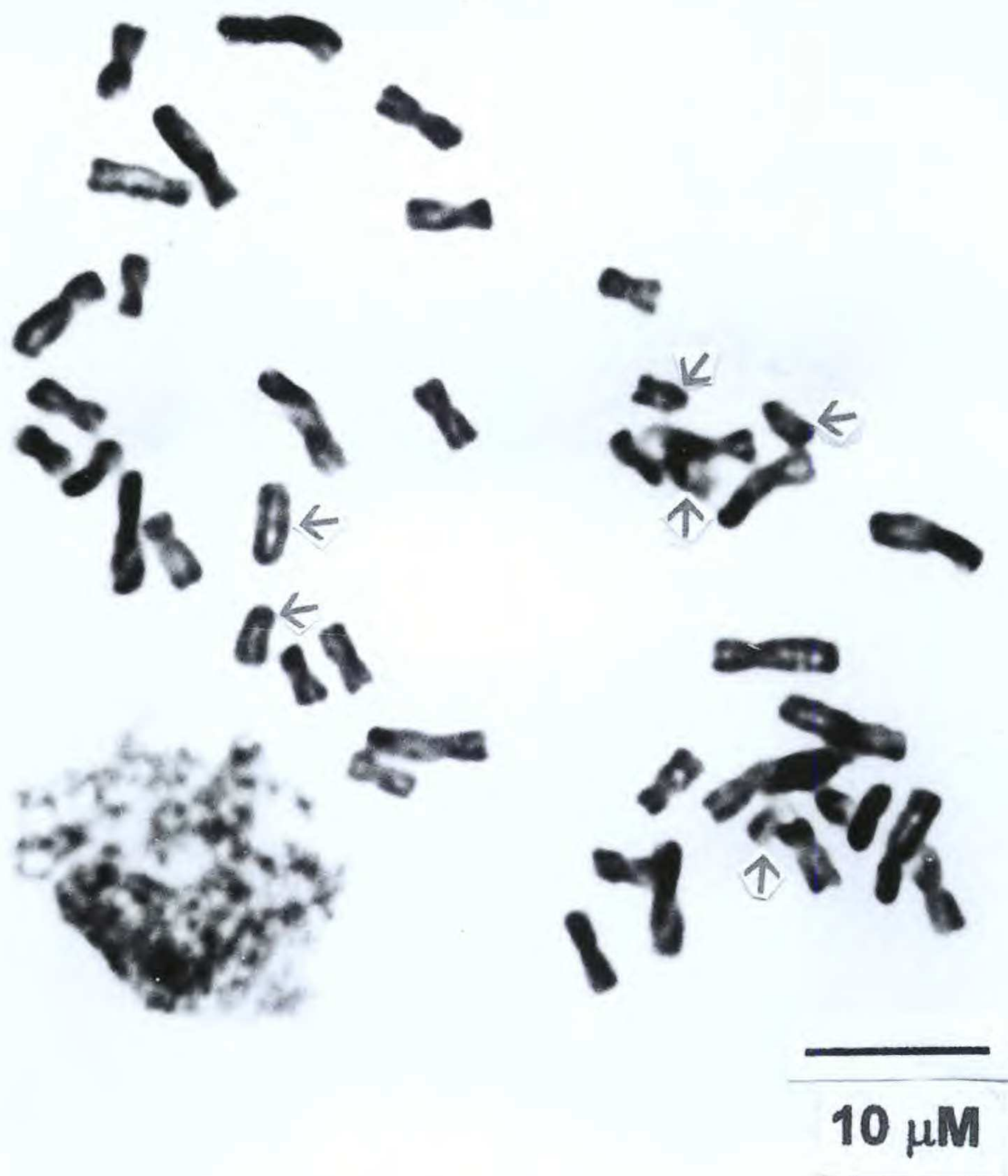


Figure 6. Somatic chromosomes of *Hymenocallis franklinensis*, $2n = 43$, from Smith, Garland & Knight 1631. Arrows point to 6 telocentric chromosomes.

cm wide. In *Hymenocallis choctawensis*, the bracts are triangular and are not long tapering in the distal half. Its fruits are broadly trigonous and measure 3–4 cm long by 3 cm wide, larger than the 2.5×2.5 cm ones of *H. franklinensis*. Most distinctive are the leaves of *H. franklinensis* being narrowly liguliform, nearly erect, channeled throughout their length, and lustrous, in sharp contrast with the wider oblanceolate, arching, only proximally channeled, and more brightly green leaves of *H. choctawensis* (Smith & Garland, 1996).

The following key distinguishes among five species of *Hymenocallis* found in Florida that are likely to be confused with one another.

- 1a. Leaves oblanceolate, 2.5–6 cm wide.
 - 2a. Scape bracts with apex acute, 3–6 cm long; bulb ovoid, rhizomatous *H. choctawensis* Traub
 - 2b. Scape bracts with apex long acuminate, 4–7 cm long; bulb globose, nonrhizomatous *H. occidentalis* (J. Le Conte) Kunth
- 1b. Leaves narrowly liguliform or narrowly oblanceolate, 1–2.7 cm wide.

- 3a. Scape bracts, lanceolate, 3.5–5 cm \times ca. 15 mm *H. franklinensis* G. Lom. Smith, Anderson & Flory
- 3b. Scape bracts narrowly lanceolate, 2.5–6 cm \times 5–10 mm.
- 4a. Staminal cup funnellform at peak anthesis, 2–3 \times 3.5–4.5 cm; leaves nearly erect, channeled for most of their length *H. crassifolia* Herbert
- 4b. Staminal cup rotate at peak anthesis, 3–4 \times 4–5.5 cm; leaves arching, channeled proximally *H. duvalensis* Traub

Paratypes. U.S.A. **Florida:** Franklin Co., CR-370 access, Cow Creek near its confluence with the Ochlockonee River, 1 mi. E. of hwy. 319, 13 June 1991, Smith & Anderson 1531 (FSU), 13 June 1991, Smith & Anderson 1532 (FSU, HPU), 16 May 1992, Garland & Knight 831 (FSU), 16 Apr. 1994, Smith, Garland & Knight 1631 (FLAS, FSU, GA, HPU, MO, USF); 4 Apr. 1998, Smith & Anderson 1717 (HPU), 22 Apr. 1998, Anderson 18299 (FSU). Wakulla Co., Shepherd's Spring of St. Marks National Wildlife Refuge, 22 July 1996, Anderson 16814 (FSU).

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